NASA-CR-201422

CASE WESTERN RESERVE UNIVERSITY

June 7, 1996
Barrie A. Caldwell
Procurement Technician
NASA
Ames Research Center
Moffett Field CA 94035-1000
Re: NASA-Ames Agreement No. **NAG2-941**

Dear Mr. Caldwell,

This constitutes the remaining two reports, requirements for the close-out of NASA-Ames Agreement No. NAG2-941.

- **There were no inventions or patents nor** is there likely to be any patents or new devices that resulted from this award.

- A summary of our findings is as follows. The purpose was to determine if chamber exposure to low levels of CO_2 results in functional alterations in dead space, gas mixing, and closing volume in healthy human subjects. Four healthy volunteer subjects, the same as were exposed to 0.7% CO_2 in a previous study, were exposed to 1.2% CO_2. Spirometry, lung volumes, single breath nitrogen washout, DLCO by two methods, and cardiac output were measured in triplicate. DLCO and cardiac output were added to the protocol due to the capability of the measuring equipment. Values were obtained over two non-consecutive days during the training period (control) and on days 2, 4, 6, 10, 13, and 23 of exposure to 1.2% CO_2. Measurements were made during the same time of day. There was one day of testing after exposure: while in the chamber but off carbon dioxide. The order of testing (up until measurements of DLCO and cardiac output) were randomized to avoid presentation effects. The consistent findings were a reduction in diffusing capacity for carbon monoxide and a fall in cardiac output, occurring to a similar degree with both exposures. There was no indication of major effects on gas mixing or dead space. Overall, there appears to be a small change in the function of distal gas exchanging units. The likelihood of pathophysiologic changes in lung function or structure with 0.07 and 1.2% CO_2 exposure for this period of time, however, is low.

FINAL Report

Reports of our efforts in this award were presented in three forums. A contract report of the DARA/ESA/NASA Joint CO2 Study was submitted to NASA on September 22, 1995; this report contained summary reports of all projects, including our own report (USA-09). An abstract of our study was presented at the ASGSB meeting in Washington D.C. in October, 1995 (Strohl KP, Mueller K, Sexton J, Elliot A, Prisk K, Gerzer D. ASGSB Bulletin 9:58A, 1995). A manuscript describing the results of our part of the study has been submitted for review.

Respectfully submitted,

Kingman P. Strohl

Kingman P. Strohl M.D.
Principal Investigator

Philip A. Corcoran
Assistant Director
Research Administration
Case Western Reserve University

Department of Medicine
Division of Pulmonary and Critical Care Medicine III(W)

VA Medical Center
10701 East Boulevard
Cleveland Ohio 44106

Phone 216-791-3800 ext 4754
Fax 216-231-3420

JUN 19 1996

cc: Chuck Wright, 236-5 CASI